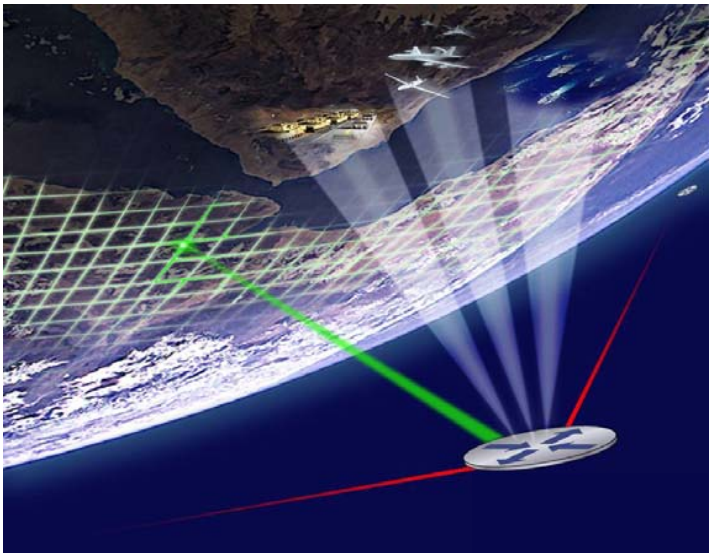
TSAT

Transformational Satellite Communications System (TSAT)



Mission/Vision

TSAT will provide unprecedented satellite communications with Internet-like capability which will extend the DoD Global Information Grid (GIG) to deployed users worldwide and deliver an order of magnitude increase in capacity.

TSAT will also enable real-time and persistent worldwide connectivity to Air and Space Intelligence, Surveillance and Reconnaissance (AISR / SISR) assets; providing increased situational awareness and targeting information to the warfighter. In addition, TSAT will provide increased connectivity for protected communications (low probability of detection, low probability of intercept and jam resistance) to users “on the move” with small antennas.

These increased functional capabilities will allow deployed and mobile ISR assets, planners, commanders, and combatants to collaborate and exchange real-time information, thus enabling network-centric warfare. The real-time availability of situational awareness information will help ensure our forces operate within the decision cycle of the enemy.

In many respects, TSAT will be an evolution of both the protected and wideband Military Satellite Communications (MILSATCOM) systems. It will provide data rates historically associated with wideband systems such as the Defense Satellite Communications System (DSCS) and Wideband Gapfiller Satellites (WGS), but with the added security of protected systems such as Milstar and the Advanced Extremely High Frequency (AEHF) System. These advances come from the incorporation of new technologies such as advanced laser communications, RF waveforms and Internet-like switching.

Capabilities

The TSAT Space Segment will deliver improvements in connectivity, capacity, interoperability, availability, security, and speed. The total worldwide capacity of TSAT will be 28.5 Gbps and will support a broad range of users across ground, air and space. For example, a ground mobile TSAT user can connect at 1.5 Mega-bits-per-second using a one-foot antenna. Where feasible, the burden is placed on the satellite to allow users to connect at high rates with smaller antennas. This reduction in user antenna size provides communications on the move (COTM) capability for more maneuverable and lethal forces. The higher protected data rates provided by TSAT will significantly decrease the time required to send and receive vital information. Airborne and space based ISR assets will also be supported at high data rates using RF and laser links.

TSAT consists of a ring of five satellites that are laser crosslinked. The combination of high-speed links and onboard routing will mean more direct routing for user information and less dependence on vulnerable ground sites.

In addition, the satellite constellation is capable of establishing circuit-based RF crosslinks to the AEHF constellation and will be backward compatible with AEHF circuit-based terminals.

Dynamic Bandwidth Resource Allocation (DBRA) will allow users to log on to a satellite and dynamically obtain the needed bandwidth based on the information demand, jamming or adverse weather conditions. Dynamic bandwidth resource allocation allows the system to take full advantage of the available margin based on current conditions, providing significant increases in system capacity.

Network-centric interoperability is an essential element of TSAT. The network aspects of TSAT are managed through the TSAT Mission Operations System (TMOS). TMOS includes both the operations management element that provides the long-term policy and operational planning functions, and the network operations element that provides real-time management of the operation and configuration of the TSAT network. The network operations element function is similar to a typical terrestrial network operations center, but with the addition of satellite network resource management functions. TMOS also provides the terrestrial TSAT interfaces to the Global Information Grid.

Description

The TSAT program is in the systems definition and risk reduction phase. The primary focus is to develop a detailed system design that is affordable and meets warfighter requirements, and to mature the technologies needed to support those designs. This will ensure the follow-on production phase goes smoothly. The TMOS development and production contract is expected to be awarded in late 2005 and the satellite segment development and production contract is expected to be awarded in late 2006.

General Characteristics

Primary Function	Space-based component of the GIG, extending its reach to deployed users
Schedule	1st Launch – 2013; FOC - 2018
Payload	Protected high data rate EHF, K-band (receive only) RF and Laser payloads
Constellations	5 TSAT geosynchronous
Capacity	Order of magnitude above current programs of record
Launch Vehicle	Delta IV and Atlas V EELVs
Control	SGLS, USB and In-band (EHF)

TSAT

Connecting anyone, anywhere, anytime

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